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Experimental Modification of Appraisal Style: Benefits of Seeing the Big Picture

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Experimental Modification of Appraisal Style: Benefits of Seeing the Big Picture

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Abstract

Experimental Modification of Appraisal Style: Benefits of Seeing the Big Picture

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The purpose of the present study was to determine whether computer-based cognitive bias modification (CBM) procedures could alter appraisal style toward viewing events from a big picture perspective and thereby influence emotional reactivity. Big picture appraisal entails viewing difficult situations and one's reactions to them in terms of a larger context. Appraisal training was implicit in that participants completed a series of vignettes, framed as a reading comprehension task, which trained either a big picture perspective or a personal/evaluative focus. When subsequently confronted with novel vignettes, participants produced interpretations that were consistent with assigned training condition. In addition, participants trained in big picture as compared to personal/evaluative appraisal subsequently demonstrated less emotional reactivity to a stressful task.

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Literature Review

Empirical study of emotion regulation is critical for a number of reasons. Perhaps most notably, emotion regulatory processes are central to mental health. Emotion dysregulation is involved in over half of the DSM-IV Axis I disorders and in all of the Axis II disorders (Gross & Levenson, 1997). Due to the central role emotion regulation plays in the onset and maintenance of psychopathology, attention is currently turning to the process of emotion regulation as one element in the development of effective therapeutic treatments. Additional research is needed to further our understanding of the connection between emotional development, emotion regulation, and the emotional disorders (Moses & Barlow, 2006). Such information will allow psychological interventions to evolve.

EMOTION REGULATION

Defining emotion regulation. The field of emotion regulation is devoted to examining the ways in which individuals influence their emotions and how such modifications contribute to various psychological outcomes. In his seminal article on the subject, Gross (1998) defines emotion regulation as, "the process by which individuals influence which emotions they have, when they have them, and how they experience and express these emotions" (p. 275). It is important to note that emotion regulation can be done consciously or unconsciously and regulatory strategies may be automatic or controlled. Gross highlights the complexity of emotion regulation by explaining that

emotions are multicomponential processes involving aspects of behavioral, experiential, and physiological domains.

Process model of emotion regulation. Gross suggests a process-oriented approach to conceptualizing emotion regulation strategies. He distinguishes five sets of emotion regulatory processes: situation selection, situation modification, attention deployment, cognitive change, and response modulation (Gross, 1998). These five processes fall under the two broad categories of antecedent-focused emotion regulation, or processes that occur before emotion is generated, and response-focused emotion regulation, processes that occur after emotion is generated (Gross, 1998; Gross & Munoz, 1995). Response modulation is the only one of the five processes that falls under the category of response-focused emotion regulation strategies.

Within the broader categories of these five processes, a number of specific emotion regulation strategies have been defined. For instance, problem solving falls under the larger process of situation modification. Distraction, rumination, and concentration represent strategies that are involved in attentional deployment processes. The process of cognitive change is particularly relevant to the present study. One form of cognitive change that has received recent attention is reappraisal, or the process of transforming a situation so as to alter its emotional impact. As various strategies have been defined, it is important to determine the consequences associated with each.

Adaptive and maladaptive forms of emotion regulation. A number of studies have begun to explore the various emotion regulation strategies in an attempt to determine which strategies are beneficial to individuals and which are not. Aldao, Nolen-

Hoeksema, and Schweizer (2010) conducted a meta-analytic review examining the relationships between six emotion-regulation strategies (acceptance, avoidance, problem solving, reappraisal, rumination, and suppression) and symptoms of four psychopathologies (anxiety, depression, eating, and substance-related disorders). Among their findings, results showed reappraisal, problem solving, and acceptance served as adaptive regulatory strategies across a variety of contexts. In contrast, suppression, avoidance, and rumination were found to be maladaptive strategies.

More specifically, Aldoa et al. conducted a direct comparison of the degree to which each emotion regulation strategy was related to psychopathology. The researchers found that the relationship between emotion regulation strategies and psychopathology may vary by strategy and type of psychopathology. Certain emotion regulation strategies were more strongly related to overall pathology than others. For instance, when studying the relationship between each emotion regulation strategy across the four disorders, they found that the effect size for rumination was large, effect sizes for avoidance, problem solving, and suppression were medium to large, and effect sizes for reappraisal and acceptance were small to medium. This particular finding may demonstrate that maladaptive emotion regulation strategies are more harmful than the relative absence of adaptive strategies. In addition, the relationships between certain emotion regulation strategies were stronger for depression and anxiety than for substance abuse and eating disorders suggesting that mood-related disorders may be more closely related to certain problems in emotion regulation than externalizing disorders.

Emotion regulation and mindfulness. A concept that has recently received much attention within the realm of emotion regulation is mindfulness. The roots of mindfulness can be traced back to the meditation techniques used by Buddhist monks and lay people beginning more than 2,500 years ago (Kumar, Feldman, & Hayes, 2008). In recent decades, mindfulness has been explored by researchers in an effort to illuminate the psychological processes involved in mindfulness practice and how such processes may be beneficial for mental health (see Brown & Ryan, 2003; Hayes et al., 1999; Linehan, 1993; Teasdale, Segal, Williams, Redgeway, Soulsby, and Lau, 2000).

Mindfulness has been defined as an "awareness that emerges through paying attention on purpose, in the present moment, and non-judgmentally to the unfolding of experience moment by moment" (Kabat-Zinn, 2003, p. 145). There are a number of theorized benefits that accompany mindful awareness. When an individual is attuned to the present, he or she is unable to engage in thought processes that go beyond the present moment, such as rumination. Similarly, present awareness is thought to prevent avoidance, an emotion regulation strategy linked to depression and anxiety (Aldoa et al. 2010; Brown & Ryan, 2003).

In addition to encouraging a particular type of awareness, mindfulness incorporates a component of curiosity and acceptance for one's thoughts, experiences, and emotions (Bishop et al., 2004). By adopting an accepting and non-judgmental attitude towards one's experiences, unpleasant thoughts and emotions are accompanied by less emotional distress (Bishop et al., 2004; Hayes, et al., 1999). Such non-judgmental acceptance may help the individual engage in fewer avoidant cognitive and behavioral

strategies when dealing with difficult emotions, thus allowing them to engage in behaviors considered more psychologically adaptive (Bishop et al., 2004; Neff, 2003).

Mindfulness-related concepts have been incorporated into a number of mental health treatments targeted at psychopathologies such as depression, anxiety, and borderline personality disorder (see Brown & Ryan, 2003; Hayes, et al., 1999; Kabat-Zinn, 1982; Linehan, 1993; Teasdale, Segal, Williams, Ridgeway, Soulsby, & Lau, 2000). Work by Teasdale, Segal, and Williams (1995) suggests mindfulness may prevent depressive relapse (Nolen-Hoeksema, 1987, 1991, 2000). Linehan's Dialectical Behavior Therapy (DBT), used in the treatment of borderline personality disorder, incorporates components of mindfulness. Research has shown that DBT can be effective in reducing self-harm behaviors and emotional lability in patients with the disorder who experience consistent suicidal ideation (Linehan, 1993). In addition, mindfulness-based stress-reduction (MBSR) has been found to reduce distress in a variety of contexts including in treatment centers for chronic pain and oncology (Carlson, Speca, Patel & Goodey, 2003; Kabat-Zinn, Lipworth, & Burney, 1985). Together, these findings support the notion that mindfulness facilitates beneficial emotion regulation strategies. Additionally, mindfulness has contributed to recent interest in attentional deployment methods of emotion regulation.

Reappraisal. Reappraisal represents one such regulatory strategy involving attentional deployment. Gross & John define reappraisal as a form of cognitive change that involves construing a potentially emotion-eliciting situation in such a way that changes its emotional influence. These researchers (2007) have argued that *reappraisal*

of stressors is an adaptive emotion regulation strategy because it can alter cognitive-emotional processes arising in response to an emotion-inducing event at an early stage of processing and does not demand a high level of cognitive resources. In support of this, studies have tended to show reduced distress and physiological reactivity among individuals who reappraise (Godin, Manber-Ball, Werner, Heimberg, & Gross, 2009; Gross, 1998).

Gross & John (2003) conducted a series of studies that illuminated the specific benefits of reappraisal by examining individual differences in use of reappraisal versus suppression and the implications of such differences on affect, well-being, and social relationships. Expressive suppression was defined as a form of response modulation that entails the inhibition of emotion-expressive behavior. In contrast to reappraisal, suppression is a response-focused strategy. It occurs relatively late in the emotion generative process, and primarily modifies the behavioral aspect of emotion response tendencies.

In order to designate individuals as "reappraisers" or "suppressors", the researchers derived the Emotion Regulation Questionnaire (ERQ). For each item on the ERQ, the researchers labeled which emotion regulatory process was being measured. Examples of items include, "I control my emotions by changing the way I think about the situation I'm in" (reappraisal) and "I control my emotions by not expressing them" (suppression). Additionally, both the reappraisal scale of the ERQ as well as the suppression scale included at least one item asking about regulating negative emotions

and one item about regulating positive emotions. The resulting ERQ consisted of 10 items that participants rated on a scale from 1 (strongly disagree) to 7 (strongly agree).

To study the implications of using suppression and reappraisal for affective responding, the researchers related ERQ Reappraisal and Suppression to self-reports of emotion experience, and to self- and peer-reports of emotion expression. In choosing to include peer-reports, the researchers explain that many instances of emotion expression both take place in social interaction and are often triggered by social interaction. Thus, peers serve as a rich source of information regarding an individual's emotionally expressive behavior. To further examine the implication of emotion regulation on social functioning, participants completed measures of avoidance and attachment, peers rated individuals on *relationship closeness* as well as *peer liking*, and indices of *social support* (Emotional Support and Instrumental Support scales from the COPE) were included. Finally, to assess overall Well-Being, the following instruments were administered: the Beck Depression Inventory (BDI), the Center for Epidemiological Studies Depression Scale (CES-D), the Self-Rating Depression Scale, the Satisfaction With Life Scale, and the Rosenberg Self-Esteem scale.

Gross and John's findings demonstrate a number of implications of individual differences in those who use reappraisal as compared to those who employ suppression. Reappraisers were found to negotiate stressful situations by taking an optimistic attitude, reinterpreting what they find stressful, and making active efforts to repair negative moods. Reappraisers both experience and express more positive emotion and less negative emotion than those who reappraise less frequently. Socially, reappraisers are

more likely to share both positive and negative emotions with others, and they have closer social relationships. In regards to well-being, reappraisers demonstrate fewer depressive symptoms, greater self-esteem and higher life-satisfaction.

On the other hand, suppressors experience themselves as inauthentic, feeling that they mislead others about their true self. Compared with those who do not use suppression, they handle stressful situations by masking their inner feelings and working to hide their outward display of emotion. They have less clarity regarding their feelings, are less successful at mood repair, and view their emotions in a less favorable or accepting light. They have less positive emotional experience and expression. They experience more negative emotions including distressing feelings of inauthenticity. Socially, suppressors appear reluctant to share both negative and positive emotions with others and they avoid close relationships. Finally, suppressors score lowest in the domain of positive relations with others, they have lower levels of self-esteem, are less satisfied with life, and have more depressive symptoms.

In sum, the findings of Gross & John extend prior empirical work by demonstrating the following: individuals differ in their use of suppression and reappraisal; these differences are significant and meaningful; and these differences have systematic effects in naturally occurring situations. Also, these findings show long-term consequences of using reappraisal and suppression in everyday life.

Big picture appraisal. It is clear that reappraisal represents a powerful and beneficial emotion regulation strategy. The important question of what sorts of reappraisals are helpful in modulating emotional reactions has only begun to receive

research attention A promising new direction in reappraisal work, explored in several labs, has supported the utility of reappraisals that broaden individuals' perspectives on distressing events (e.g., Kross & Ayduk, 2011; Kross, Ayduk, & Mischel, 2005; Rude, Mazzetti, Pal, & Stauble, 2011; Schartau, Dalgleish, & Dunn, 2009). In Dr. Rude's research lab, we refer to the appraisal strategy utilized in these various studies as *big picture appraisal*. We define big picture appraisal as viewing a difficult situation and one's reactions to it in ways that transcend or go beyond the immediate perspective and view the situation in context. For current purposes, big-picture appraisal is operationally defined as maintaining awareness of how a distressing event and/or one's reactions to it fit into one or more larger contexts: (1) an extended time perspective which includes an awareness of how emotional states fluctuate and distress tends to dissipate with time; (2) the broader context of one's life, which contains both wanted and unwanted experiences; and (3) the broader human context, in which human wants and needs are fundamentally similar, and distress and fallibility are universal.

In support of this framework, Rude et al. (2011) found that college students who reported a recent interpersonal rejection experienced lower levels of rumination after receiving an experimental *big picture* intervention as compared to either of two control interventions. Participants in the big picture reappraisal condition wrote in response to probe questions that encouraged them to consider how they would feel about the experience in 1-2 years time, how their responses were similar to those of other people, and how a neutral observer might describe the situation. Instructions for one control condition asked participants to explore the *reasons* for the event and their reactions to it

(e.g., Why do you think this happened?); another control condition did not write about their rejection experience.

Self-distancing. Several other researchers have shown benefits of taking a larger perspective. Kross and colleagues (e.g. Kross & Ayduk, 2011) have conducted a series of studies examining an appraisal strategy they term "self-distancing". This work began in an effort to address what Kross & Aykuk (2011) call the "self-reflection paradox". This paradox refers to contradictory findings regarding self-reflection in current literature. On the one hand, a number of studies suggest that reflecting on negative emotions leads to important physical and mental health benefits (e.g. Pennebaker, 1997). Theory suggests that through reflection, people develop explanations for their negative experiences, providing them with closure and emotional relief. On the other hand, another set of studies indicate that people's attempts to understand their feelings are harmful, leading to ruminations that make them feel worse (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008). Acknowledging this paradox, Kross and Ayduk set out to explore why self-reflection on negative experiences sometimes succeeds and at other times fails. More specifically, Kross & Ayduk set out to locate the psychological mechanisms that enable individuals to reflect on negative experiences adaptively.

In their effort to address this question, Kross & Ayduk began studying self-distancing, an approach to negative experiences that allows individuals to focus on the broader context of the situation at hand in order to reconstrue their experiences in ways that reduce distress. These researchers conceptualize self-distancing as becoming an observer of the self. The idea is that self-distancing allows individuals to process their

negative emotions and experiences from an ego-decentered, third person perspective. This enables individuals to contemplate emotional experiences without activating intense levels of affect. The person is better able to achieve representations of the reasons underlying their negative experience. Thus, the authors point out that self-distancing capitalizes on the unique benefits associated with both emotional approach and emotional avoidance strategies in that it functions to decrease emotional reactivity, as avoidance strategies do when successfully implemented, while simultaneously allowing the individual to focus on and work through negative feelings, an important feature of adaptive emotional approach strategies. A number of studies (described below) subsequently demonstrated the beneficial nature of this type of perspective/appraisal.

Kross and colleagues (e.g., Kross & Ayduk, 2011) have found in multiple studies that participants instructed to analyze reasons for a distressing event while adopting a *self-distanced* perspective (e.g. "…take a few steps back and move away from your experience…watch the experience unfold as if it were happening all over again to the distant you…" Kross & Ayduk, 2008, p. 926), experience less distress, lower physiological reactivity, and less rumination as compared to control participants instructed to adopt either a self-immersed perspective (e.g. "… relive the situation as if it were happening to you all over again" Kross & Ayduk, 2008, p. 926) or participants instructed to adopt a distraction strategy. Self-distancing has also been associated with more problem-solving behavior and less reciprocation of negativity during conflicts (Ayduk & Kross, 2010). In addition, reflecting on past provocations from a self-distanced perspective was found to reduce aggressive thoughts and angry feelings (Kross, Gard,

Deldin, Clifton, & Ayduk, 2012). Benefits have been found both immediately following and up to one week after the self-distancing manipulation (Kross & Ayduk, 2008; Ayduk & Kross, 2010; Kross et al., 2005). Kross and colleagues (e.g., Kross & Ayduk, 2011) have interpreted their self-distancing manipulation as helping participants view distressing events in context.

Perspective broadening. Schartau, Dalgleish, and Dunn (2009) represent another group of researchers examining a type of big picture appraisal. Shartau and colleagues conducted a series of studies in which participants trained to appraise negative experiences using what the researchers termed *perspective broadening* demonstrated superior outcomes compared to control participants. In three studies, participants trained in perspective broadening were instructed to adopt one or more of four appraisal themes as they watched a series of distressing films. These appraisal themes included: "*Bad things happen*—bad things happen in the world, and I need to put them behind me and move on; *Silver lining*—there are usually some good aspects to every situation, and it is important to focus on these; *Broader perspective*—bad events are rare overall, and lots of good things are happening all the time; and *Time heals*—in the (near) future, this will not seem anywhere near as bad as it does now" (Shartau et al., 2009, p. 17). Control participants were given no appraisal instructions. In comparison, participants in the perspective broadening condition showed lower levels of self-reported negative emotion and electrodermal responses to a final test film. Similar effects were found in a follow-up study when participants were instructed to apply perspective broadening appraisal themes

to distressing autobiographical memories and demonstrated reduced intrusion and avoidance of negative memories relative to control participants.

In sum, a number of recent studies point to the beneficial effects of big picture appraisal. In order to understand this emotion regulation strategy more fully, empirical work is needed to determine the causal mechanisms of big picture appraisal as well as its direct effect on emotional outcomes. An innovative body of research called cognitive bias modification offers the tools to address these important questions.

COGNITIVE BIAS MODIFICATION

The field of cognitive bias modification (CBM) provides researchers with a way to test the causal pathway between cognitive biases and relevant symptoms of psychopathology. This is important because cognitive models of emotional dysfunction contend that biased patterns in information processing play a central causal role in vulnerability to experience psychopathology, specifically anxiety and depression. Individuals prone to anxiety or depression are more likely than others to attend more to emotionally negative cues, to interpret ambiguity in a negative way, and to selectively recall negative information (Mathews & MacLeod, 2005). The term CBM refers to procedures designed to change particular styles of cognitive processing that are theorized to contribute to emotional dysfunction using systematic practice in an alternative processing style (Koster, Fox, & MacLeod, 2009).

Purpose of CBM research. In their review of CBM approaches to anxiety, MacLeod and Mathews (2012) outline two primary objectives of CBM research. "First,

CBM allows for determination of the causal status of cognitive biases by allowing for the direct manipulation of a cognitive process and a subsequent examination of effects. Second, CBM enables an evaluation of the therapeutic potential of direct bias modification" (p. 193).

The nature of CBM methodologies. CBM procedures are designed to directly modify one specific low-level bias in selective information processing, usually assumed to operate prior to conscious thought (Koster et al., 2009). These biases relate to attention, interpretation of ambiguity, memory, and appraisal, among other processes. In addition, CBM procedures do not rely on insight. The targeted biases do not need to be introspectively accessible to the individual. CBM simply seeks to change the target bias through extended practice on a task designed to induce change.

Another component of CBM methodologies includes the study of what Hertel & Mathews (2011) call transfer tasks. The purpose of transfer tasks is to determine whether the style of thinking trained using CBM generalizes to other tasks. Hertel and Mathews distinguish between near transfer effects, those with a strong degree of overlap between training and transfer task and far transfer effects, those with a lesser degree of overlap between training and the nature of the transfer task. Most CBM studies employ near-transfer tasks. That is, the situations during training are similar to those in the transfer phase. These near-transfer tasks are used to examine the extent to which training in one type of attention of interpretation task generalizes to other tasks with similar processing requirements.

Far-transfer effects are demonstrated when the context of the training and that of the transfer task are substantially different. Stressful transfer tasks such as emotional response to viewing a distressing video can be thought of as far-transfer tasks. Far-transfer effects are powerful because they are used to establish causal links between cognitive processing bias and emotional reactivity.

The exact nature of CBM procedures depends on the particular type of bias being targeted as well as the psychological outcome under investigation. CBM procedures have been designed to modify attentional biases, interpretive biases, biases in memory, and appraisal biases, among others. For the purpose of the present study, I will focus on studies seeking to modify interpretive and appraisal biases (CBM-I).

Findings of CBM targeting interpretive selectivity. Interpretive bias, or the tendency to interpret ambiguity negatively has been proven to be characteristic of clinical and subclinical anxiety dysfunction (Mathews & Mackintosh 2000). CBM procedures aimed at modifying interpretive biases (CBM-I) present participants with ambiguous information and encourage a certain type of interpretive style. The idea is that through practice, participants will come to adopt a particular pattern of selective interpretation. One version of CBM-I, first created by Mathews & Mackintosh (2000) provided participants with a series of textual descriptions of ambiguous situations, and participants were instructed to complete a final word fragment that provided a meaningful ending to the vignette. In conditions inducing negative interpretive bias, final word fragments lead to negative interpretations of the preceding ambiguous vignette. In the positive interpretive bias induction group, fragment completions lead to positive interpretation of

ambiguity. As an example, consider the following vignette (from Hertel & Mathews, 2011):

> You have decided to go caving even though you feel nervous about being in an enclosed space. You get to the caves before anyone else arrives. Going deep inside the cave you realize you have completely lost your…*w_y* (*way*, a negative interpretation) or *f_ar* (*fear*, a positive interpretation).

Research has shown that extended practice using such training procedures leads to induced changes in interpretive biases (e.g., Grey & Mathews 2009).

A number of studies have demonstrated the effectiveness of interpretive bias training. Mathews & Mckintosh (2000) found that participants trained in a positive interpretive bias subsequently reported lower state anxiety levels than those who completed the task in the negative interpretive bias condition. Additional research confirmed and extended these findings by showing that the same interpretive bias training (positive condition vs. negative condition) led to significant decline not only in state anxiety but in trait anxiety questionnaire scores as well (Salemink et al., 2007, 2009). CBM-I procedures have also proven effective in decreasing social anxiety (Beard & Amir, 2008) and reducing the frequency of negative thought intrusions in worry-prone individuals (Hirsch et al., 2009) and participants who meet diagnostic criteria for GAD (Hayes et al., 2010).

Several researchers have examined whether CBM-I can influence subsequent emotional reactivity. Wilson and colleagues (2006) conducted a study in which they delivered a single session of Grey and Mathews' (2000) CBM-I task to mid-trait anxious

students and then exposed them to a distressing video clip. Participants in the negative bias interpretation group demonstrated elevation of both state anxiety and depression in response to the video clips, while the clips did not lead to such elevations in the positive bias interpretation group.

Researchers have also employed multiple sessions of CBM-I delivered over more extended periods of time in order to examine the extent to which CBM-I effects endure. Mathews et al. (2007) delivered four CBM-I sessions across a two-week period to high trait anxious individuals. When assessed one week later, participants in the positive interpretive training condition demonstrated reduced negative interpretation of ambiguity and reported lowered trait anxiety scores than those in the control condition. Extended CBM-I procedures were also shown to be beneficial in reducing trait anxiety in individuals with a pre-existing high level of anxiety vulnerability (Salemink et al., 2009), and in decreasing social anxiety symptoms (Beard & Amir, 2008; Vassilopoulos et al., 2009).

Findings of CBM targeting modification of appraisal. A process closely related to interpretive bias training is the training of specific appraisal styles. Appraisal processes have been shown to contribute to a number of positive psychological outcomes (Gross & John, 2003). Researchers have begun to seek ways of directly modifying appraisal styles and several studies have proven effective at explicitly directing participants to practice appraising situations in a particular fashion (e.g., Schartau et al. 2009, Watkins et al. 2009). Lang and colleagues (2009) conducted a study in which they tested the hypothesis that appraising negative intrusive memories in maladaptive ways

serves to increase the frequency of such memories. These researchers modified Mathews & Mackintosh's CBM procedure to train participants in either an appraise-negative or appraise-positive style. Participants received a single session of training before being exposed to a distressing film. Across the following seven days, participants trained in the appraise-positive condition reported lower levels of negative memory intrusion concerning the film than those trained in the appraise-negative condition. These findings suggest that the style in which negative memory intrusions are appraised causally influences their frequency. MacLeod and Mathews (2012) suggest the need for further studies to extend appraisal bias modification work in order to test hypotheses concerning the causal contributions of appraisal style to both positive and negative psychological outcomes.

The results of these studies undoubtedly support the idea that interpretive and appraisal biases causally contribute to variation in vulnerability to and symptoms of various emotional disturbances, especially those related to anxiety and depression. These findings lend support to cognitive models of emotional dysfunction that implicate biased interpretation in the etiology of pathology. In addition, they bode well for the potential therapeutic value of CBM-I.

Future directions in CBM. While CBM work has demonstrated many impressive findings, this field is not without limitations. It is important to note the gaps that currently exist in the CBM literature and to consider how future work can address such shortcomings. In his review of CBM procedures in the management of mental disorders, MacLeod (2012) points out that while much research has demonstrated the

effectiveness of CBM-I in alleviating anxiety, little research has examined the effects of CBM-I on depression. An important area for investigation involves the question of whether CBM-I can contribute to the illumination of causal mechanisms contributing to the development as well as the treatment of clinical depression. As Peters et al. (2011) argue, support for specific theories of depression could be augmented by experimental work that demonstrates that manipulations in cognitive biases are associated with changes in vulnerability to depression.

Considering the broader category of emotion regulation research under which CBM work falls, another major limitation in our current knowledge involves the relative efficacy of different forms of emotion regulation. Broadening the research on various emotion regulation strategies, using CBM methodology, will allow us to gain a better understanding of the relationships between certain emotion regulatory processes and psychological outcomes.

PRESENT STUDY

The present study seeks to expand existing work in the fields of emotion regulation and cognitive bias modification by examining the effects of a specific type of regulatory strategy (big picture appraisal) on emotional reactivity (a risk factor for depression) using CBM methodology. The aims of the current study were to determine whether (1) a relatively automatic big picture appraisal style can be trained using cognitive bias modification (CBM) procedures, and (2) this appraisal style will lessen emotional reactivity to a stressor. We sought to extend the evidence described above for

benefits of big picture thinking by showing that participants can be trained to adopt this appraisal style relatively automatically and that this can reduce their vulnerability to distress from subsequent events.

Introduction

The regulation of emotional states has been increasingly recognized as an important element of adaptive coping (Moses & Barlow, 2006). Considerable evidence suggests that suppression and avoidant coping methods are associated with increased distress (Aldoa, Nolen-Hoeksema, & Schweizer, 2010) and are characteristic of individuals suffering from depression and anxiety disorders. Accordingly, Gross and Thompson (2007) have argued that *reappraisal* of stressors is an adaptive emotion regulation strategy because it can alter cognitive-emotional processes arising in response to an emotion-inducing event at an early stage of processing and does not demand a high level of cognitive resources. In support of this, studies have tended to show reduced distress and physiological reactivity among individuals who reappraise (Godin, Manber-Ball, Werner, Heimberg, & Gross, 2009; Gross, 1998). But the important question of what sorts of reappraisals are helpful in modulating emotional reactions has only begun to receive research attention.

A promising new direction in reappraisal work, explored in several labs, has supported the utility of reappraisals that broaden individuals' perspectives on distressing events (e.g., Kross & Ayduk, 2011; Kross, Ayduk, & Mischel, 2005; Rude, Mazzetti, Pal, & Stauble, 2011; Schartau, Dalgleish, & Dunn, 2009). We refer to the appraisal strategy utilized in these various studies as *big picture appraisal*. We define big picture appraisal as viewing a difficult situation and one's reactions to it in ways that transcend or go beyond the immediate perspective and view the situation in context. For current purposes,

big-picture appraisal is operationally defined as maintaining awareness of how a distressing event and/or one's reactions to it fit into one or more larger contexts: (1) an extended time perspective which includes an awareness of how emotional states fluctuate and distress tends to dissipate with time; (2) the broader context of one's life, which contains both wanted and unwanted experiences; and (3) the broader human context, in which human wants and needs are fundamentally similar, and distress and fallibility are universal.

In support of this framework, Rude et al. (2011) found that college students who reported a recent interpersonal rejection experienced lower levels of rumination after receiving an experimental *big picture* intervention as compared to either of two control interventions. Participants in the big picture reappraisal condition wrote in response to probe questions that encouraged them to consider how they would feel about the experience in 1-2 years time, how their responses were similar to those of other people, and how a neutral observer might describe the situation. Instructions for one control condition asked participants to explore the *reasons* for the event and their reactions to it (e.g., Why do you think this happened?); another control condition did not write about their rejection experience.

Several other researchers have shown benefits of taking a larger perspective. Most notably, Kross and colleagues (e.g., Kross & Ayduk, 2011) have found in multiple studies that participants instructed to analyze reasons for a distressing event while adopting what these researchers term a *self-distanced* perspective (e.g. "…take a few steps back and move away from your experience…watch the experience unfold as if it

were happening all over again to the distant you…" Kross & Ayduk, 2008, p. 926), experience less distress, lower physiological reactivity, and less rumination as compared to control participants instructed to adopt either a self-immersed perspective perspective (e.g. "… relive the situation as if it were happening to you all over again" Kross & Ayduk, 2008, p. 926) or participants instructed to adopt a distraction strategy. Self-distancing has also been associated with more problem-solving behavior and less reciprocation of negativity during conflicts (Ayduk & Kross, 2010). In addition, reflecting on past provocations from a self-distanced perspective was found to reduce aggressive thoughts and angry feelings (Kross, Gard, Deldin, Clifton, & Ayduk, 2012). Benefits have been found both immediately following and up to one week after the self-distancing manipulation (Kross & Ayduk, 2008; Ayduk & Kross, 2010; Kross et al., 2005). Kross and colleagues (e.g., Kross & Ayduk, 2011) have interpreted their self-distancing manipulation as helping participants view distressing events in context.

Finally, Schartau, Dalgleish, and Dunn (2009) conducted a series of studies in which participants trained to appraise negative experiences using what Schartau et al. termed *perspective broadening* demonstrated superior outcomes compared to control participants. In three studies, participants trained in perspective broadening were instructed to adopt one or more of four appraisal themes as they watched a series of distressing films. These appraisal themes included: "*Bad things happen*—bad things happen in the world, and I need to put them behind me and move on; *Silver lining*—there are usually some good aspects to every situation, and it is important to focus on these; *Broader perspective*—bad events are rare overall, and lots of good things are happening

all the time; and *Time heals*—in the (near) future, this will not seem anywhere near as bad as it does now" (Shartau et al., 2009, p. 17). Control participants were given no appraisal instructions. In comparison, participants in the perspective broadening condition showed lower levels of self-reported negative emotion and electrodermal responses to a final test film. Similar effects were found in Study 4 when participants were instructed to apply perspective broadening appraisal themes to distressing autobiographical memories and demonstrated reduced intrusion and avoidance of negative memories relative to control participants.

The aims of the present study were to determine whether (1) a relatively automatic big picture appraisal style can be trained using cognitive bias modification (CBM) procedures, and (2) this appraisal style will lessen emotional reactivity to a stressor. CBM has been shown to produce relatively enduring changes in cognitive biases relevant to anxiety, with some demonstration of substantive practical/clinical benefits (e.g., MacLeod & Mathews, 2012). Importantly for our purposes, CBM training is implicit and appears to produce a relatively automatic bias (Hertel & Matthews, 2011). Hence, we sought to extend the evidence described above for benefits of big picture thinking by showing that participants can be trained to adopt this appraisal style relatively automatically and that this can reduce their vulnerability to distress from subsequent events.

In the current study we randomly assigned participants to receive CBM training in either big picture appraisal or *personal/evaluative appraisal*. The latter interprets events largely in terms of positive or negative personal traits. Participants read a series of

positive and negative vignettes, presented as a reading comprehension task, while imagining they were the main character. Vignettes were identical across condition except for final words/phrases that distinguished the training conditions. After the initial training phase, participants completed a transfer task in which they viewed a new set of vignettes and, following a buffer task, selected one phrase (from a set of three) that seemed closest to what they had read in each of the transfer task vignettes. Observing whether participants chose phrases similar in meaning to the condition in which they were trained allowed us to determine whether training generalized to new situations. Finally, participants were given very difficult word association problems which they were led to believe reflected their intelligence. Mood was measured before and after training, and again after the stressor task.

Method

Participants

One hundred forty two participants (55 male, 87 female) were recruited from an undergraduate subject pool at a large Southwestern university. Participants' ages ranged from 18 to 57 (M= 21). Thirty-two point four percent of the sample identified as Caucasian/White, 7% as African-American/Black, 23.9% as Hispanic-American/Latino/Chicano, 0.7% Native American, 28.2% Asian American, 2.1% Middle Eastern/Arab-American, 4.2% as multiracial and 4.0% identified as "Other." International students comprised 5.6% of the sample and 24.6% of participants designated English as their second language.

Materials

Appraisal training conditions. Each of the 64 vignettes used to train appraisal bias consisted of 3-5 sentences. The final word or phrase was specific to condition and determined the personal/evaluative or big-picture appraisal (examples below). This word or phrase included a word fragment that participants were instructed to complete. Each word fragment allowed only one completion and was fairly easy to guess. A simple "yes/no" comprehension question followed. The generation of key words/phrases and comprehension questions were intended to enhance training effects (see Hertel & Matthews, 2011) as well as to make the reading comprehension cover story more plausible. Vignettes were presented in blocks of eight, each consisting of four negatively

and four positively valenced vignettes. Order of negatively and positively valenced items was mixed so as not to be predictable.

The vignettes were adapted from a set developed by Watkins, Moberly, and Moulds (2008, Experiment 3) and we modeled our personal/evaluative training after the *abstract/evaluative* training condition in these vignettes. Watkins et al. (2008) describe this condition as characterized by high-level construals, as addressing *why* events happen, and as consistent with depressive rumination. We chose it as a comparison condition in part because it seemed the logical counterpart to big picture appraisal and in part because we surmised that it exemplifies the way people are likely to think about emotionally relevant events.

In the big picture condition, the final vignette phrases endorsed a broad, contextualized perspective in one of several ways: by adopting an extended time perspective; by recognizing the inevitability of both good and bad experiences in life; or by recognizing the similarity of humans and the universality of suffering. In the personal/evaluative condition, the final vignette phrases ascribed events to global personal traits and tended to have an evaluative tone. Following are examples of a negative followed by a positive vignette that, depending on the ending, is completed to represent each of the big picture appraisal categories or a corresponding personal/evaluative appraisal.

Big picture: extended time perspective

You have finally found a house that seems perfect and have shared the news with everyone you know. You made an offer that was accepted by the sellers, but the

following day the real estate agent calls to say your financing has been rejected at the last minute. As she explains the situation, you are aware of feeling disappointed. Then, you think about how you will feel when (several months have pa_sed) [*passed*, big picture]/ (you have to tell pe_ple) [*people*, personal/evaluative].

Will your disappointment go away before long? Yes/No (big picture)

Will you feel uncomfortable telling your friends the deal fell through? Yes/No (personal/evaluative)

You are currently taking a public speaking class. Talking in front of others makes you very nervous, and as a result your first speech does not go well. This week you gave your second speech and did much better. As you reflect on your performance you realize (things often improve with ti_e) [*time*, big picture]/ (you have what it tak_s) [*takes*, personal/evaluative].

Did you mess up during your second speech? Yes/No (same question for both conditions)

Big picture: inevitability of both wanted and unwanted experiences

Every Sunday afternoon you play as the goalkeeper for your local soccer team. Near the beginning of one game, you jump to make a save, but you fumble the ball and it drops behind into the goal. As you fall awkwardly on the ground, you think, ("@#$% happ_ns") [*happens*, big picture]/("I'm a kl_tz") [*klutz*, personal/evaluative].

Do athletic moves always go smoothly? Yes/No (big picture)

Do you think you are clumsy? Yes/No (personal/evaluative)

You just received your grades for the semester. You had a particularly tough load this semester and have worked really hard. You're certainly glad to see the semester coming to a close. As you look at the grades you are pleased to see that they are better than you had hoped. You enjoy your success knowing that (you will not always perform perf_ctly) [*perfectly*, big picture]/(you are really talent_d) [*talented*, personal/evaluative].

Are you seeing the big picture? Yes/No (big picture)

Are you good with academics? Yes/No (personal/evaluative)

Big picture: similarity of human experience and universality of suffering

After a day of heavy rain, your neighbor calls to say that a flood alert has been issued for your street and that people are putting up sandbags. You arrive home to find your neighbors in the street sharing information about the damages. It doesn't take long for you to discover that your ground floors have been flooded. You are (unit_d by this misfortune) [*united*, big picture]/(overwh_lmed by this misfortune) [*overwhelmed*, personal/evaluative].

Are you alone in your misfortune? Yes/No (big picture)

Is the situation too much for you? Yes/No (personal/evaluative)

You give a co-worker some advice about a problem she's having with the boss. It doesn't seem like much at the time, but this morning you receive an email from her saying that she followed your suggestions and the situation is much improved. Thinking about her words, you think (we've all been through situatio_s like hers) [*situations*, big picture]/(you are w_se)[*wise*, personal/evaluative].

Does her email remind you that everyone experiences hard times? Yes/No (big picture)

Does her email make you feel knowledgeable? Yes/No (personal/evaluative)

Recognition transfer task. The training vignettes were followed by a set of 18 new vignettes, each headed with a brief identifying title. Unlike the training vignettes, which induced a specific type of interpretation, the transfer task vignettes used word fragments whose completion left the interpretation of the vignette ambiguous. Similar to the training vignettes, the transfer task vignettes were followed by a comprehension question. An example follows:

The gossip

One morning you are at school having coffee with some of your classmates. You tell them a juicy piece of gossip about one of your peers. Suddenly the person you are talking about appears at the door. You aren't certain how much they've heard but you realize you were not being careful and reflect with regret on your actio_s [*actions*].

Are you drinking tea? Yes/No

After participants completed a short buffer task which consisted of ten easy true/false questions (e.g., "Admirals are people"), a recognition test was used to assess the interpretations that were made of these vignettes. For this, participants read the identifying title of each transfer test paragraph, followed by three versions of the final sentence, reflecting either a personal/evaluative-, a big picture-, or an irrelevant interpretation of the vignette. An example follows:

The gossip

(a) Suddenly this classmate appears at the door, and you regret this mistake that is so easy for people to make (big picture).

(b) Suddenly this classmate appears at the door, and you regret your social incompetence (personal/evaluative).

(c) Suddenly this classmate appears at the door, and you realize that you were so surprised you spilled your coffee (irrelevant).

Participants were instructed to rank each option in terms of how similar it was in meaning to the transfer vignette. The number of first-ranked interpretations that reflected big picture versus personal/evaluative appraisals were tallied and served as the dependent measure.

Mood measure—positive and negative affect schedule *(PANAS; Watson*, Clark, & Tellegen, *1988)*. The PANAS consists of two 10-item scales measuring positive affect (e.g., "enthusiastic", "excited", "proud") and negative affect (e.g., "distressed," "hostile," "scared"). Each item is rated for the extent to which the participant feels that way right

now on a 5—point scale from 1 (very slightly or not at all) to 5 (extremely). The PANAS has been found to be a reliable and valid measure of mood (Watson et al., 1988).

Ruminative response scale (RRS; Nolen-Hoeksema & Morrow, 1991) asks respondents to rate how frequently they react to depressed mood with ruminative thoughts (e.g., ‘‘think ‘Why am I the only person with these problems?’’’), symptoms (e.g., “Think about your feelings of fatigue and achiness”), or consequences of the depressive mood (e.g., ‘‘think ‘I won’t be able to do my job/work because I feel so badly’”). The items are scored 1 (Never), 2 (Sometimes), 3 (Often), or 4 (Almost Always). Nolen-Hoeksema and Morrow (1991) have reported good internal consistency ($\alpha = .89$) and predictive validity.

Remote associations task (RAT)—stressor task with failure feedback. The failure-feedback task was a modified, computerized version of the Remote Associations Task. This method of negative mood induction was used successfully by Watkins (2004), Hunt (1998), McFarlin and Blascovich (1984), and Brown and Dutton (1995). The task was described to participants as a measure of intelligence.

Participants were presented with a set of three words all of which shared a fourth word as a common associate. To solve each problem, participants typed this fourth word in the designated answer space. Similar to the procedure used by Watkins (2004), participants were given 15 very difficult items and were falsely informed that most people get 5 to 7 of the items correct (modal number correct was actually one). Subjects had 30 seconds to complete each of the 15 items.

Procedure

Participants completed the study in group sessions conducted in a computer lab on campus. They were told that the researcher was interested in studying emotion, memory, and reading comprehension. After giving written informed consent, participants were seated at a computer where they completed the study via an online survey program. First, participants completed a short demographics questionnaire, the RRS, and then the first PANAS measure of mood. Next, they worked through the training phase in their assigned condition. After completing all of the training vignettes, participants read the transfer task vignettes, completed the filler task (judging statements as true or false), and then the recognition rank orderings for the transfer task. Next, participants completed a second PANAS measure of mood and then attempted the RAT stressor task, before rating their mood again with the PANAS (post stress measure). Finally, participants were individually debriefed regarding the deception used in describing the stressor task.

Results

As a first step in analyses, groups were compared on demographic and pretest study variables. Hypotheses were tested using trait rumination (RRS) as a covariate and sex as a factor since both variables have been shown to covary with emotion regulation style and mood (Gross & John, 2003; Nolen-Hoeksema, 2012). The alpha was set at .05; in order to maximize power one-tailed tests were used to test directional hypotheses. Unless noted in text, *p* values presented are two-tailed.

Descriptive Statistics

Participants assigned to the big picture and personal/evaluative conditions did not differ in sex, racial composition, (European American, Asian American, Hispanic, Other), English as native language, or age, (all *p*s $> .4$). Additionally, no significant differences were found in initial PANAS negative mood, PANAS positive mood, or trait rumination (RRS) scores, (all *p*s $> .4$).

Testing the Induction of Appraisal Style

An ANCOVA with training condition and sex as the between-subjects factors, RRS as the covariate, and number of big picture endings selected as most accurately representing each of the 18 ambiguous vignettes as the dependent variable revealed a significant main effect of training, $F(1, 137) = 13.47$, $p < .001$ (one-tailed), $\eta^2 = .09$ indicating that participants chose more big picture interpretations in the big picture as

compared to the evaluative training condition, $M = 10.33$ ($SD = 4.35$) and $M = 7.93$ ($SD = 3.71$), respectively.

TESTING THE EFFECT OF TRAINING ON MOOD

Mood immediately following training. Mood was compared between the big picture and personal/evaluative conditions immediately post training. Two ANCOVAs were conducted, one using negative mood and the other using positive mood as the dependent variable. Training condition and sex were factors, and corresponding mood at pre-training as well as RRS score were included as covariates. As expected, no differences in negative or positive mood were found immediately following training, $F(1, 138) = 1.27$, $p = .26$, $\eta^2 = .01$ and $F(1,138)=1.59$, $p= .21$, $\eta^2 =, .01$ respectively (Table 1). There was a non-significant trend for males to have higher positive affect than females, $F(1, 128) = 3.75$, $p = .06$, $\eta^2 = .03$. There were no other effects of sex or sex by condition interactions in this analysis (all ps > .2).

Mood following the RAT stressor task. Next, a pair of ANCOVAs, parallel to those described above, was conducted on post-stressor mood scores. As expected, participants in the big picture condition reported significantly less negative mood after the stressor task than those in the personal/evaluative condition, $F(1,137)=2.94$, $p=.04$, $\eta^2 = .02$ (one-tailed). There were no significant differences in positive mood, post stressor, $F < 1$, however, males had significantly higher positive mood than did females, $F(1, 137)= 12.19$, $p < .01$, $\eta^2 = .09$. No other effects in this analysis were significant (all ps > .17). See Table 1.

Discussion

In the present study we used a computer-based cognitive-bias modification (CBM) training to alter appraisals of emotionally relevant events on a transfer task: Participants in the big picture training condition appraised novel vignettes using more big picture than personal/evaluative appraisals. In addition, we showed that training, while not impacting mood directly, did influence emotional reactivity to a stressor: Following an induced failure, participants in the big picture training condition reported lower negative mood than those in the personal/evaluative condition.

An important aspect of these findings is that training was implicit and the resultant bias appeared to be relatively automatic. While the implicit nature of interpretive bias training is under debate, post training debriefing indicated that virtually all participants found the reading comprehension cover story credible, suggesting participants' attention was not explicitly focused on their appraisals,. Hence, the likelihood that training effects are due to demand characteristics or expectation is low. While some CBM work suggest that participant awareness of the training component can be beneficial (Salemink et al.), it has also been shown that automatic appraisals may be more effective in influencing mood, less likely to be disrupted by cognitive distraction (c.f., Nolen-Hoeksema, 2012), and less likely to be negated by "second-guessing" or individual attempts to resist being influenced (Dillard & Shen, 2005). While it remains to be determined how enduring the effects of training are, one can easily imagine a

cumulative effect, whereby subtle changes in automatic appraisals influence mood and behavior, which in turn lead to more positive appraisals, more positive mood and behavior, and so on.

The fact that the effect of training upon emotional reactivity was small must be acknowledged: Negative but not positive mood showed condition differences following the stressor and this effect was significant only using a one-tailed test. The negative mood scale tends to capture anxious and angry, as compared to sad, feelings, which are captured more by low scores on the positive mood scale; and it makes sense that the stressor task tended to produce more anxiety and anger than sadness. The small effect size ($\eta^{2} = .02$) for negative mood post stressor may reflect a need for more extensive exposure to training materials or the development of more effective vignettes. Nonetheless, the observation of even a very small effect on participants' mood in response to manipulated failure feedback should not be discounted. It is encouraging that such a brief (approximately 45 minutes) implicit training task would have an effect on participant mood in a simulated life stress situation.

Several limitations of the present study must be acknowledged. First, the study did not include a no-training control condition; hence, we do not know how appraisals or emotional reactivity in either trained condition would compare to the effects of no training. In addition, big picture training was multifaceted, with vignettes covering categories of extended time perspective, the universality of human experience, and the inevitability of positive and negative life experiences. It is possible that only a subset of these categories account for the observed effects. It will be important for future studies to

determine whether particular dimensions of big picture thinking are responsible for beneficial outcomes. It will also be important for future research to incorporate longer follow-up periods in order to assess the durability of appraisal training and to determine whether big picture training is useful for individuals at risk for particular emotional disorders such as depression, anxiety, or substance abuse disorders.

In conclusion, this study demonstrates that a big picture appraisal style can be trained such that it is applied, apparently automatically, to a new context, and that it influences emotional reactivity. Results provide preliminary validation of big picture appraisal as potentially useful for people facing distressing experiences. Findings are consistent with claims that reappraising in this way can provide emotional balance, or equanimity (Mazzetti & Rude, 2012; Rude, 2012). Upon further development, CBM training of big picture appraisal could be part of an intervention for depression, and other disorders in which people are emotionally disregulated (c.f., Hertel & Mathews, 2011). It may be possible to integrate big picture appraisal training into a multi-component intervention as is starting to be investigated in clinical populations (e.g. Brosan, Hoppitt, Shelfer, Sillence, & Mackintosh, 2011; Lang, Blackwell, Harmer, Davison, & Holmes, 2012). Also, having developed a training that can manipulate big-picture appraisal allows for the experimental investigation of the impact of this specific appraisal style on various emotional outcomes.

Tables

Table I

Means and Standard Deviations of Outcome Measures by Training Group at Times 1(start of session), 2(immediately after training), and 3(after the stressor task)

	Training Group					
	Big Picture			Evaluative		
	n	*M*	*SD*	*n*	*M*	*SD*
PANAS-NA						
Time 1	70	13.34	(3.61)	71	13.82	(3.93)
Time 2	70	12.93	(3.77)	68	13.46	(4.29)
Time 3	69	14.33	(4.64)	68	15.40	(5.44)
PANAS-PA						
Time 1	70	23.41	(7.83)	71	23.31	(8.23)
Time 2	70	18.49	(7.31)	68	19.78	(8.22)
Time 3	69	15.59	(6.38)	68	16.10	(6.36)

Note. PANAS-NA= Positive and Negative Affect Schedule- Negative Affect, PANAS-PA = Positive and Negative Affect Schedule-Positive Affect.

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